

REMARKS/ARGUMENTS

Claim 1 is amended by this response. No claims are canceled. Accordingly, claims 1 and 5-9 remain pending.

Embodiments in accordance with the present invention relate to semiconductor packages featuring a diepad having a supplemental downbond portion to receive a bond wire. As described in detail in the instant application, this supplemental downbond portion enhances the efficiency of utilization of available space by the package:

a supplemental downbond portion 311 integral with and projecting from the main diepad portion into space formerly occupied by non-integral diepad leads located at the end of the package, which have now been slightly shortened in length.

[0050] Downbond wire 312 extends from PIC Gnd contact 314 to supplemental downbond portion 311 of the diepad, freeing up space on the main portion of the diepad to support PIC die 302. (Emphasis added; ¶[0049]-[0050])

The enhanced space efficiency conferred by the claimed embodiments, is further highlighted in the specification in connection with Figures 5 and 6 (reproduced below):

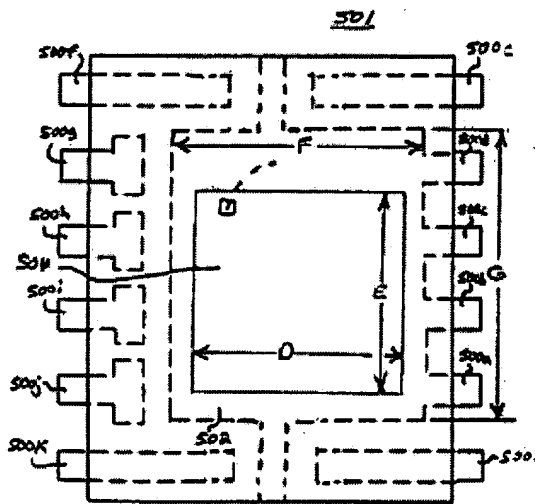


FIG. 5
(prior art)

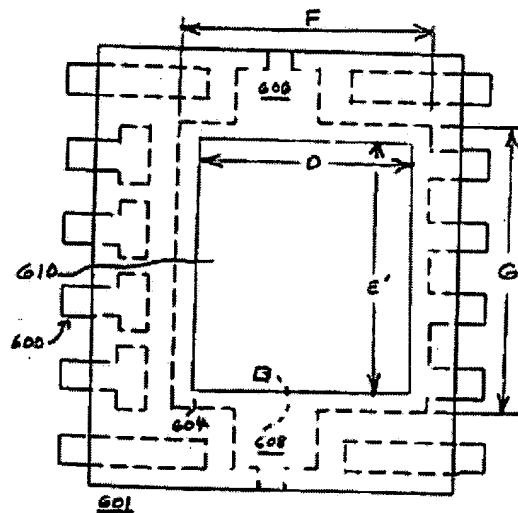


FIG. 6

[0054] Fig. 6 shows a corresponding twelve lead package 601 in accordance with an alternative embodiment of the present invention. Lead frame 600 of package 601 features diepad 604 having two supplemental downbond portions 606 and

608 positioned at either end of the package. In the package shown in Fig. 6, PIC die 610 having a length E' of 2.073 mm and a width D' of 1.47 mm (die area 3.047 mm²) is housed on a diepad 604 having the same dimensions as that of Fig. 5, resulting in an improved space efficiency of 84.5%. (Emphasis added; ¶[0054])

Accordingly, pending independent claim 1 recites as follows:

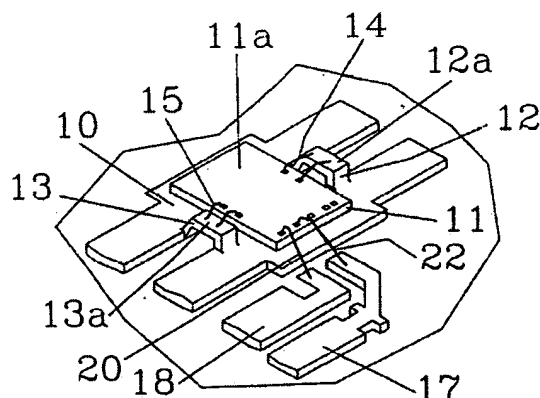
1. A package for a semiconductor device comprising:
a semiconductor die having a laterally conducting structure and a ground contact on an upper surface; and
a leadframe comprising,
a diepad in contact with a lower surface of the die,
a lead separated from the diepad, and
a supplemental downbond diepad portion projecting from a main portion of the diepad and configured to receive a downbond wire from the ground contact, the supplemental diepad portion positioned between an end of the package and the die, and immediately between the lead and a second lead that is also separate from the diepad. (Emphasis added)

Independent claim 1 stands rejected as anticipated by U.S. patent no. 5,479,050 to Pritchard et al. ("the Pritchard patent"). As a threshold matter, the Examiner is reminded:

for anticipation under 35 U.S.C. 102, the reference must teach every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught must be inherently present. (Emphasis added; MPEP 706.02)

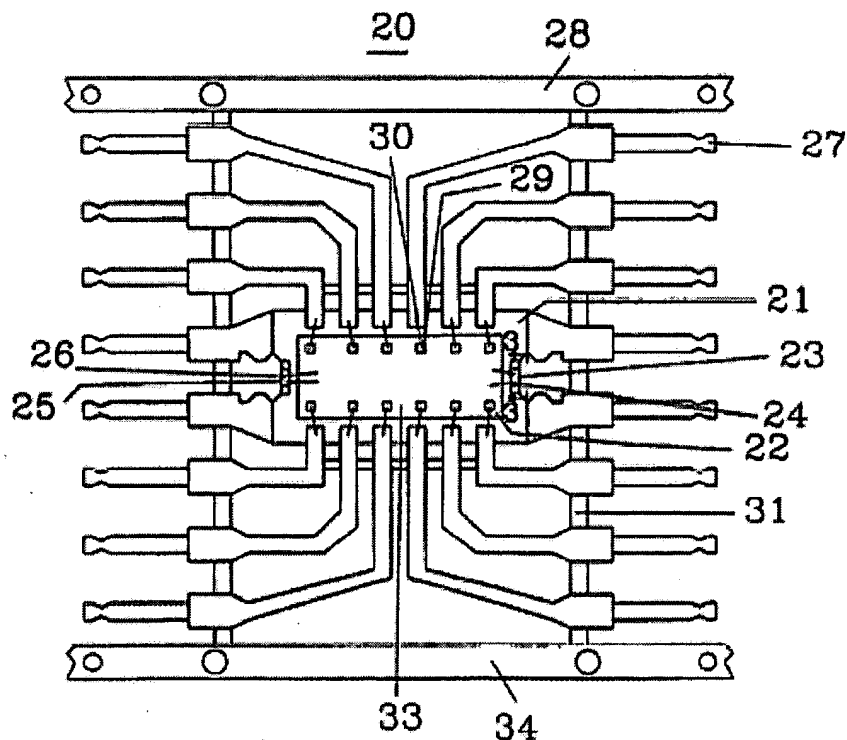
Here, the Pritchard patent shows a diepad featuring a raised downbond portion configured to receive a bond wire. However, there is no teaching in the Pritchard patent that this raised downbond portion be positioned between an end of the package and leads separate from the diepad, as is currently recited by the pending claims.

Specifically, Figure 1 of the Pritchard patent is reproduced below:



This figure does not illustrate a diepad having a supplemental downbond portion positioned between nonintegral leads in the manner of the claimed embodiments. Rather, bridges 12 and 13 of die mount pad 16 of Figure 1 are positioned between a pair of leads (not labeled) that are integral with the die mount pad 16.

Figure 2 of the Pritchard patent is reproduced below:



This Figure 2 also fails to illustrate a diepad having a supplemental downbond portion positioned between nonintegral leads in the manner of the claimed embodiments. Instead, pedestals 23 and

25 are formed on die mount pad 21 between respective pairs of leads (not labeled) that are integral with the die mount pad 21.

In the latest office action, the Examiner has simply asserted that pedestals 23 and 25 of Figure 2 are "between" those leads extending from the side of the lead frame which are not integral with the die mount pad.

However, Applicants believe this assertion mischaracterizes the actual physical appearance of the lead frame depicted in Figure 2, in particular ignoring the close proximity of pedestals 23 and 25 relative to the adjacent pairs of integral leads. Nevertheless, for purposes of clarification, pending claim 1 has now been amended to recite that the supplemental diepad portion is positioned immediately between the non-integral lead and a second non-integral lead, as disclosed in the instant application at least in Figure 6. .

The Examiner has also rejected certain claims as obvious based upon the Pritchard patent. However, in order to establish a prima facie case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. (MPEP 2143). Here, the Pritchard patent fails even to suggest the supplemental downbond pad portion of claim 1.

Specifically, as described in detail above in connection with Figures 5 and 6, the supplemental downbond portions of the claimed embodiments serve to enhance efficiency of utilization of space by the package.

By contrast, the raised pedestal/bridge features of the die mount pads of Figures 1 and 2 of the Pritchard patent, perform an entirely different function. In particular, the Pritchard patent addresses the problem of unwanted contact between die and bond wire during fabrication of conventional packages:

[a]nother problem is that the pad bond wire sags and makes contact with the die prior to molding. (Emphasis added; col. 1, lines 22-24)

Accordingly, the raised profile of the bridge/pedestal features of the Pritchard patent prevent such unwanted contact:

The bond wire being attached to a point above the surface of the die prevents sagging of the bond wire and unwanted contact of the wire with the die during bonding and prior to molding. (Emphasis added; col. 1, lines 41-44)


Finally, it is important to note that the raised pedestal/bridge features of the Pritchard patent actually reduce the space efficiency of that package design. Specifically, the raised bridges/pedestals of the Pritchard patent occupy existing space on the diepad that could otherwise be occupied by a die.

The reduction in space efficiency of the Pritchard package, stands in stark contrast to the enhanced space efficiency offered by the claimed embodiments, wherein the supplemental downbond portions are located in regions occupied by the non-integral leads of conventional packages. This in turn allows space on the diepad formerly delegated to receive the bond wires, to be reallocated to receive a larger size die, thereby enhancing space efficiency of the package.

In sum, the Pritchard patent contains absolutely no teaching or even suggestion to utilize supplemental downbond portions of a diepad in the manner of the claimed embodiments. By performing a completely different function from the supplemental downbond die pad portion of the claimed embodiments, to achieve a completely different result, the bridge/pedestal features of the lead frame of the Pritchard patent cannot reasonably be considered to suggest the pending claims. Continued rejection of the pending claims as obvious in light of the Pritchard patent is therefore improper, and these claim rejections should be withdrawn.

In view of the foregoing, Applicants believe all claims pending in the instant patent Application are now in condition for allowance. Issuance of a formal Notice of Allowance at an early date to this effect is therefore respectfully requested. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



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